

Status Report  
for the period  
January 1964 to June 1964

UNPUBLISHED PRELIMINARY DATA

Research Grant #NSG 91-60

National Aeronautics and Space Administration  
and  
University of California, Santa Barbara

Experimental Studies  
in  
Ultraviolet Solid State Spectroscopy  
in the  
Spectral Region 3000 - 300 Å

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### Research accomplished

The work performed during the present reporting period involved the following:

1) A Kramers-Kronig dispersion analysis for CdS. The optical data used in the analysis were obtained earlier. The interpretation of the results and their correlation to the high energy interband transitions were presented in a paper at the March meeting of the American Physical Society in Philadelphia.

2) Completion of direct recording equipment for the measurement of electron energy distribution of certain metals and semiconductors. Preliminary results were obtained for indium metal at several wavelengths in the vicinity of the plasma frequency.


3) Near completion of a direct recording reflectometer for use in the vacuum ultraviolet. It is hoped that the new system will yield better resolved data reduction on the reflection spectra of various solids. The system consists of a device which diverts a portion of the light beam emerging from the monochromator to the reflectometer, so that the intensity ratio of the beam incident on the sample and the reflected beam from the sample can be related to the reflectivity of the sample directly. Provisions have been made for carrying out measurement at low temperatures and for use at near normal as well as larger angles of incidence.

4) Near completion of a low temperature sample holder for the study of x-ray induced absorption in alkali halides.

### Future research

The work for the near future will be carried out along the following directions:

1) After the completion and final test of the direct recording low temperature reflectometer, reflection spectra will be repeated for diamond, ZnS and CdS in order to resolve features



associated with spin-orbit splitting of energy bands.

2) A u.v. polarizer for the region 1200 - 1600 Å will be constructed, and reflectivity measurement in polarized light will be carried out first for hexagonal ZnS and CdS, and later for other hexagonal and non-cubic crystals.

3) More refined measurement on the electron-energy distribution near plasma frequencies will be made for indium metal. The work will be extended to semiconductors such as ZnS and CdS and the results will be compared with the reflectivity data.

4) After the low temperature sample holder is somewhat improved, temperature effect of the ultraviolet absorption edge for LiF, NaF and KF will be investigated.

#### Financial statement

In accordance with the terms of the grant, the University Accounting Office will supply an official audit of the current funds.